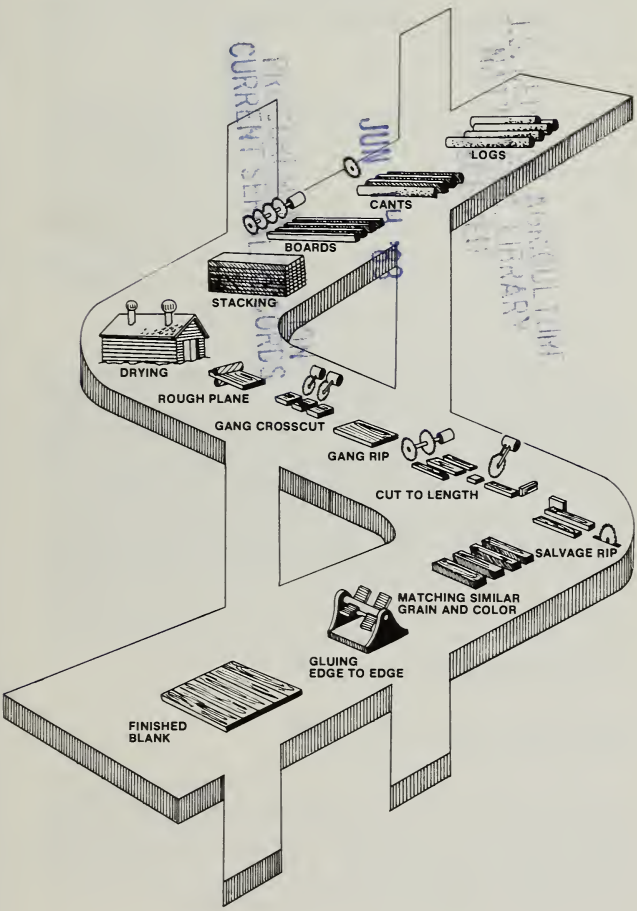
The Economics of System 6 Processing of Standard-Size Blanks



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The Economics of System 6 Processing of Standard-Size Blanks

by Bruce G. Hansen
and Hugh W. Reynolds

Introduction

From a survey to determine parts needed by the kitchen cabinet and furniture industries, we learned that nearly all of the thousands of individual dimension-part sizes used could be obtained from as few as a dozen blank sizes (wide, edge-glued panels). This knowledge led to the development of the standard-size blanks concept (Araman et al. 1982), which was a breakthrough toward the utilization of abundant lower grade hardwood resources.

System 6 (Reynolds and Gatchell 1982) uses the blanks concept to improve efficiency in low-grade utilization. Efforts are aimed at production of a few standard-size blanks rather than thousands of individual parts. As a result, processing options are minimized, and the decision process is significantly streamlined. The system is more efficient and profitable than previous methods aimed at processing dimension directly from Factory Grade 3 logs and local-use materials.

To evaluate the potential of producing blanks from cants obtained from 6-foot red oak bolts, 8 to 12 inches in diameter, we simulated operation of a System 6 mill (Reynolds et al. 1983) to process 16.6 Mbf (thousand board feet) of cants into 2,667 square feet of C2F (clear-two-face) blanks and 5,375 square feet of frame blanks daily. The plant (Fig. 1) requires an investment in land, buildings, equipment, and working capital of about $2 million and promises a return of 21 percent based on an average price for mixed C2F and frame blanks of $1.32 per square foot. The cost per square foot on an accounting basis is about $0.90.

Raw Material and Product Yield

In our study of System 6, we used 6-foot red oak cants delivered to the mill at a cost of $180 per Mbf. The overall yield in blanks was 48 percent. Two-thirds of the yield was in frame blanks selling at $1 per square foot, and one-third was in C2F blanks selling at $1.95 per square foot.

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Figure 1.—System 6 plant layout.

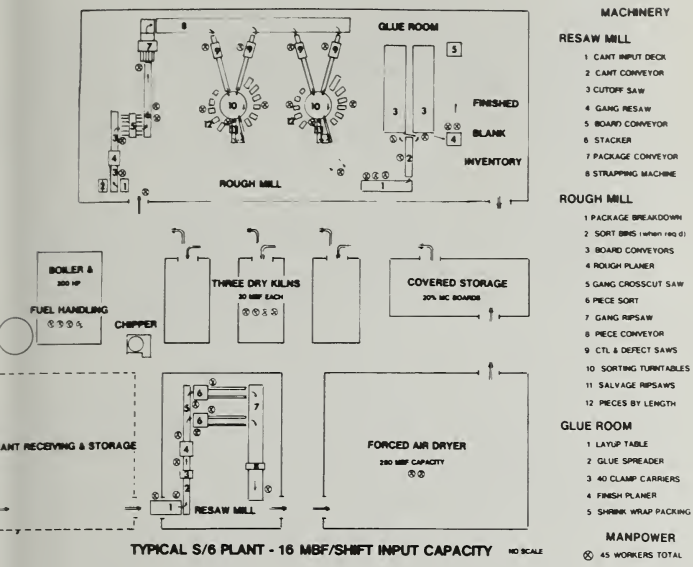


Table 1. Estimated cash flows (in thousands of dollars)

Year	Revenues	Operating costs	Depreciation[a]	Taxes[b]	After-tax[c] earnings
	One-half full production assumed in first year				
1	1,269	1,074	195	0	195[d]
2	2,538	1,710	290	247	581
3	2,538	1,710	274	255	573
4	2,538	1,710	263	260	568
5	2,538	1,710	258	262	566
6	2,538	1,710	39	363	465
7	2,538	1,710	34	365	463
8	2,538	1,710	34	365	463
9	2,538	1,710	34	365	463
10	2,538	1,710	28	368	460[e]

[a]Depreciation is based on Accelerated Cost Recovery System percentages for property placed in service between 1981 and 1984.

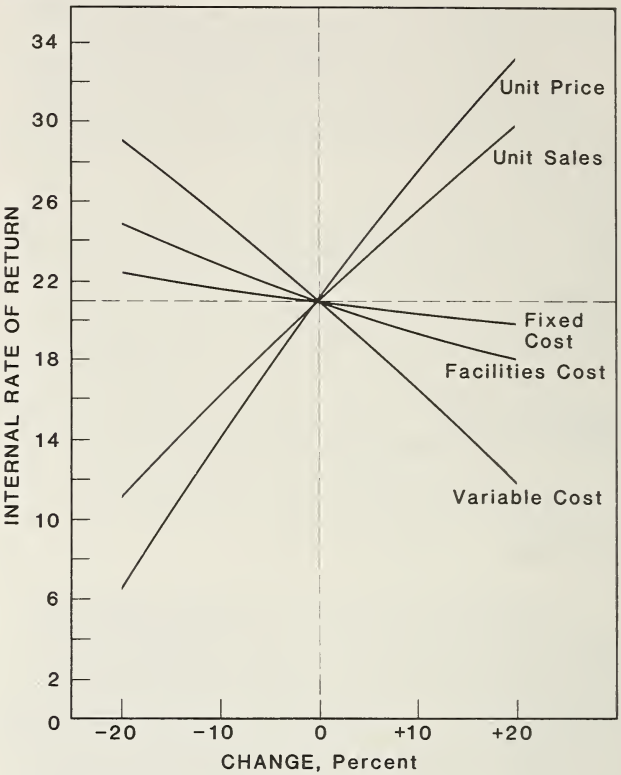
[b]Income is taxed at 46 percent.

[c]After-tax earnings = after-tax profit + depreciation.

[d]The actual net cash flow is less due to an addition made to working capital of $149,000.

[e]The actual net cash flow is larger by an amount equal to working capital of $298,000 plus the remaining book value of assets totaling $251,200.

Figure 2.—Internal-rate-of-return sensitivity to changes in selected investment parameters.



Economics

A summary of the annual cash flows used in the System 6 investment analysis is shown in Table 1. The investment analysis is based on the assumption that a complete new facility is purchased. Investment return sensitivity to changes in key input items is illustrated in Figure 2.

For those who wish to make blanks for their own use (replacing existing dimension facilities), the cost per square foot from an accounting-based perspective ranges from $0.82 to $0.90 depending on the amount of new investment required (Table 2).

Table 2. Accounting-based cost estimates for producing standard-size blanks given different percentages of capital investment depreciated on a straight-line basis over 10 years

Item ($/ft²)	Capital investment[a] 0% $0	25% $400,000	50% $800,000	75% $1,200,000	100% $1,600,000
Depreciation	0.0	0.021	0.041	0.062	0.083
Operating cost	0.820	0.820	0.820	0.820	0.820[b]
Total production cost	0.820	0.841	0.861	0.882	0.903

[a]Excludes land costs.

[b]Variable manufacturing cost = $0.719/ft², fixed manufacturing cost = $0.101/ft².

Conclusion

A link (System 6) between the low-grade hardwood resource and the high-grade requirements of the furniture and cabinet industries has been found both technologically and economically feasible. The estimated internal rate of return for System 6 of nearly 21 percent should be well within the range of acceptable investment for most manufacturers. Studies are underway to examine additional processing and product options that may yield larger returns. Exciting opportunities lie ahead for the expanded use of the low-grade hardwood resource.

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